and arranged for controlled exposure of the photoreactive composition, typically at a wavelength of emitted light that is less than 450 nm. The present invention can be used, for example, to perform a controlled exposure of a photoreactive substrate used for abrasive etching. The controlled exposure of the substrate is used to form a pattern in the substrate, which can subsequently be developed (in some implementations) to remove part of the substrate. In this manner the substrate is modified in order to produce a detailed image.

In contrast, Walt is directed to a photodepositition methodology for fabricating a three-dimensional patterned polymer microstructure, and in no way teaches a device for retaining a photosensitive substrate containing a photoreactive composition; a light emitting diode array containing a plurality of light emitting diodes; and a control mechanism for regulating the intensity and distribution of light emitted from the light emitting diode array; wherein the light emitting diodes are configured and arranged for controlled exposure of the photoreactive composition, typically at a wavelength of emitted light that is less than 450 nm.

Instead, Walt specifically teaches using reducing-fiber to diminish the size of an image and then recreate that image on the end of the fiber by reacting a prepolymer that is deposited onto the fiber or onto a non-photoreactive substrate (see column 16, line 31 to column 17, line 32). Walt permits the formation of extremely small structures on the end of this optical fiber or other substrate. This is fundamentally different from the present invention, which uses a photoreactive *substrate* that is exposed and reacted by emitted light of a wavelength of less than 450 nm. Indeed, the apparatus taught by Walt would not work with the present invention because a polymer is deposited directly onto the end of an optical fiber, which obstructs the end of the fiber, making it useless for the present invention to selectively expose various portions of a photosensitive substrate. Finally, not only does Walt teach a fundamentally different device and

process from that of the present invention, there is also no discussion in Walt of using an LED to develop a photoreactive composition.

Nakagawa is a teaching of a very specific photomask material and method of processing this material. The photomask material is a silver halide emulsion, and must be extremely thin (less than 1 μm) and formed on a glass substrate. In contrast, and as described in the specification at page 2, the photoreactive compositions of the present invention are typically relatively thick films (usually greater than 20 microns thick) that react to light in a manner such that their physical strength is significantly changed by exposure to light of specific wavelengths. This transformation in physical properties makes the photoreactive compositions, which are usually resins, well suited for screen printing and abrasive etching of images. In implementations where the photoreactive composition is strengthened upon exposure to light (such as by crosslinking), the unexposed composition can be removed to create a suitable printing screen containing only the exposed composition.

In addition, Nakagawa fails to teach the importance of using an LED having a short wavelength, which is described at length in the present application and claimed in the presently pending claims. Nakagawa provides little discussion as to the wavelength of light emitted by the LED, merely describing wavelengths of 450 nanometers, and utterly failing to teach wavelengths below 450 nm, as required in various claimed implementations of the invention.

Applicants do not believe there is any teaching or suggestion to combine the Walt and Nakagawa references. Indeed, Walt explicitly teaches the formation of three-dimensional objects using a photosensitive material, while Nakagawa teaches the formation of an extremely thin material. Thus, on even the most basic level it is evident that these two references are not suitable for combination. In addition, as discussed above with regard to the shortcomings of the

two references, it is clear that a combination of the two would not produce the present invention because the many elements individually missing between Walt and Nakagawa are not resolved by combining the references.

The Examiner has also cited Cutter as teaching the present invention. Here, too, the present invention is significantly distinct from that taught by Cutter. In contrast to the claimed invention, Cutter teaches an electronically programmed mask used to selectively expose a substrate. The teachings of Cutter are profoundly different from that of the present invention, and include the significant distinction that Cutter uses a single, broad source of light to expose an entire substrate. Cutter limits how much of that light reaches the substrate by using an electronically controlled mask. In this regard, Cutter controls light reaching the substrate by varying the contrast of portions of the mask. The presently claimed device performs no such masking function (and needs no such masking function), because the LED light source directly controls which portions of a substrate are illuminated. Thus, instead of an electronically controlled mask, the present invention uses an electronically controlled light source.

The present invention actually teaches away from the need to use a mask because the light is modulated by location and intensity of the light source applied to the substrate, rather than modulating the amount of light that is blocked. Thus, Cutter teaches the controlled exposure of a material by providing a uniform light source and then limiting how much of that light can reach a substrate using a mask. The present invention teaches using a variable light source that has a variable location and intensity of light applied to the substrate. In this manner the invention solves a similar problem with a completely different approach.

Nothing in Cutter suggests the combination with Nakagawa, and even if such combination were to be made it would not teach the present invention, as described above.

In view of the foregoing remarks, Applicants submit that this case is now in a condition for allowance, and favorable action in the form of a notice of allowance is hereby solicited.

Respectfully submitted,

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